Paper I — RESEARCH METHODOLOGY

Time : Three hours Maximum : 100 marks

PART A — (5 × 5 = 25 marks)

Answer ALL questions.

1. What are primary and secondary literatures? Explain.

2. Distinguish between precision and accuracy with suitable examples.

3. Discuss the molecular point groups.

4. Describe the principles of column chromatography.

5. Write the applications of time-resolved Fourier transform spectroscopy.

PART B — (5 × 15 = 75 marks)

Answer ALL questions.

6. (a) How will you write a scientific research paper? Discuss. (15)

Or

(b) Explain the art of writing a Ph.D. thesis. (15)

7. (a) (i) Discuss the confidence interval and confidence limits. (10)

(ii) Write a note on least square methods. (5)

Or

(b) Discuss the various types of errors analysed in Statistics. (15)

8. (a) (i) Describe the n-fold rotation and improper rotation with examples. (10)

(ii) Construct the character table for C_{3v} point group. (5)

Or

(b) Discuss the various modes of vibrations. (15)

9. (a) Describe the principles of Paper chromatography. What are its various types? Explain its applications. (15)

Or

(b) (i) Describe the experimental techniques of Thin layer chromatography. (10)

(ii) TLC is superior over with other chromatographic techniques. Explain. (5)

10. (a) (i) State and explain the fundamental laws of photometry. What are their limitations? (10)

(ii) What is meant by derivative spectroscopy? (5)

Or

(b) (i) What is spectrophotometric accuracy? Discuss. (5)

(ii) Describe the simultaneous spectrophotometric determination. (10)

Paper II — COURSE WORK — I

Time : Three hours Maximum : 100 marks

PART A — (5 × 5 = 25 marks)

Answer ALL questions.

1. What are the applications of surface enhanced Raman scattering?

2. Give a short account on phase-transfer processes in nanomaterials synthesis.

3. How would you convert tertiary alcohol into primary or secondary alcohols by retrosynthesis?

4. What are the problems associated with rheumatoid arthrits?

5. Explain photo-fries rearrangement with an example.

PART B — (5 × 15 = 75 marks)

Answer ALL questions.

6. (a) Discuss the resonance Raman effect in detail. (15)

Or

(b) Discuss :

(i) Auger electron spectroscopy. (8)

(ii) NMR imaging. (7)

7. (a) Discuss the nanosized semiconductors with suitable example. (15)

Or

(b) Give a brief account on the following :

(i) Sol-Gel synthesis. (7)

(ii) Applications of nanomaterials. (8)

8. (a) Explain any five guidelines for performing reasonable retrosynthesis of target molecules. (15)

Or

(b) Discuss the one group disconnections involved in alcohols and ketones. (15)

9. (a) Discuss the medicinal applications of platinum complexes with suitable examples. (15)

Or

(b) Discuss the functions and applications of gadolonium and indium radio pharmaceuticals. (15)

10. (a) List out the principles of green chemistry. (15)

Or

(b) Discuss the various biocatalytic reactions in green chemistry. (15)

———————